

### **REMARKS**

Claims 1, 3, 4, 11-13, and 15-18 are all the claims presently pending in the application. Applicants have not amended the claims by the present response.

Claims 1, 3, 4, 11-13, and 15-18 stand rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. Claims 1, 3, 4, 11-13, and 15-18 stand rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the enablement requirement. Claims 1, 3, 4, 11-13, and 15-18 stand rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. Claims 1, 3, 4, 11-13, 15, 16, and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Stiller et al. (Surface and Interface Analysis, 2000; hereinafter “Stiller”). Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Stiller in view of Nakagawa (U.S. Patent No. 5,353,632).

Applicants respectfully traverse these rejections in the following discussion.

#### **I. THE WRITTEN DESCRIPTION REQUIREMENT REJECTION**

Claims 1, 3, 4, 11-13, and 15-18 stand rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. Specifically, the Examiner alleges that the originally filed specification does not provide support for the feature, *“a central fragment of said light-sensitive compound between said two arms, which comprises a moiety, said moiety comprising a functional group selected from a group consisting of a sulfide, a thiol, and an isonitrile”*, as recited in exemplary claim 1.

The Examiner, however, is clearly incorrect.

In rejecting the claims, the Examiner alleges, “[n]o central fragment between the two arms, comprising a moiety, which comprises a sulfide, a thiol, and an isonitrile, is disclosed in the specification.” (See Office Action dated May 12, 2009 at page 5; emphasis added by Applicants).

Applicants submit, however, that the claimed invention does not recite, “*which comprises a sulfide, a thiol, and an isonitrile*.” Indeed, the claimed invention recites, *inter alia*, “*said moiety comprising a functional group selected from a group consisting of a sulfide, a thiol, and an isonitrile*.” (Emphasis added by Applicants).

The originally filed specification clearly provides support for this feature of the claimed invention.

Indeed, the originally filed specification states, “the moiety 130, which may include conjugated double bonds that form a stable cis or trans configuration, may be located symmetrically between the two arms 110” (see Application at page 13, lines 5-7 and Figure 1A).

Furthermore, the originally filed specification states, “the moiety 130 may include a functional group, for example, a sulfide, a thiol, or a isonitrile” (see Application at page 13, lines 13-14).

Finally, support for the above feature of the claimed invention is found in originally filed claims 4, 11, and 14.

Therefore, Applicants respectfully submit that support for the above feature of the claimed invention is found in the originally filed specification. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

## II. THE ENABLEMENT REJECTION

The Examiner alleges that the claimed invention of claims 1, 3, 4, 11-13, and 15-18 was not described in the specification in such a way as to enable one skilled in the art to which it pertains to make and use the invention. The Examiner, however, is clearly incorrect.

Applicants submit that the test for enablement is “whether that disclosure, when filed, contained sufficient information regarding the subject matter of the claims as to enable one skilled in the pertinent art to make and use the claimed invention”. More specifically, the claimed invention must be enabled “so that any person skilled in the art can make and use the invention without undue experimentation” (see M.P.E.P. § 2164.01; emphasis added by Applicants).

Applicants point out, as set forth in the M.P.E.P., that the test for enablement is not whether any experimentation is necessary, or whether the experimentation is complex, but whether the experimentation is undue (see M.P.E.P. § 2164.01).

Furthermore, Applicants point out that “[a]s long as the specification discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim, then the enablement requirement of 35 U.S.C. 112 is satisfied” (see M.P.E.P. § 2164.01 (b); emphasis added by Applicants).

Applicants submit that the above standard for the enablement requirement has been met.

The Examiner’s allegations center on the flawed reasoning that the specification allegedly does not include a detailed description of the synthesis of the light-sensitive molecules and allegedly does not include working examples of the

light-sensitive molecules. The Examiner's application of the enablement requirement standard, however, is incorrect.

Applicants point out that the claimed invention is directed to a molecule manipulator, not a synthesis of the light-sensitive compound. Specifically, claim 1, for example, recites:

*"A molecular manipulator, comprising:*

*a light-sensitive compound, said light-sensitive compound comprising:*

*two arms, each of said two arms comprising an azo double bond; and*

*a central fragment of said light-sensitive compound between said two arms,*

*which comprises a moiety, said moiety comprising a functional group selected from a group consisting of a sulfide, a thiol, and an isonitrile,*

*wherein said light-sensitive compound changes a cis-trans configuration of the double bond in response to illumination by light of a selected wavelength; and*

*a probe to which the light-sensitive molecule is attached."*

Therefore, the specification must merely disclose at least one method for making and using the molecule manipulator that bears a reasonable correlation to the scope of the claimed molecule manipulator.

Applicants submit that the specification (e.g., see specification at Figure 3 and page 14, lines 6-16) discloses at least one method for making and using the molecule manipulator that bears a reasonable correlation to the scope of the claimed molecule manipulator.

Additionally, the Examiner surprisingly alleges that the level of experimentation is undue. Applicants submit, however, that the level of

experimentation required to make and use the claimed invention is not undue.

Applicants submit that the synthesis of azo compounds is a commonly known practice. That is, those skilled in the art understand that azo compounds can be synthesized by using an azocoupling reaction (i.e., an electrophilic substitution reaction on aromatic rings with diazonium salts). Applicants are not required to include a detailed explanation of this known process in accordance with the M.P.E.P. guidelines that a “patent need not teach, and preferably omits, what is well known in the art” (see M.P.E.P. § 2164.01).

Moreover, the Examiner surprisingly alleges that Applicants have failed to provide proper working examples. Applicants point out, however, that “[c]ompliance with the enablement requirement of 35 U.S.C. 112, first paragraph, does not turn on whether an example is disclosed. An example may be ‘working’ or ‘prophetic’. A prophetic example describes an embodiment of the invention based on predicted results rather than work actually conducted or results actually achieved. An applicant need not have actually reduced the invention to practice prior to filing” (see M.P.E.P. § 2164.02; emphasis add by Applicants). Therefore, Applicants submit that the examples provided in Figures 1 and 2 of the Application are sufficient for purposes of providing an enabling disclosure of the claimed invention.

The Examiner’s rejection relies mainly on the assertions that Applicants’ disclosure is allegedly “hypothetical” and does not provide “examples” of the synthesis of the claimed molecular manipulator.

#### Breadth of the Claims

The Examiner continues to allege that the specification does not provide any guidance for the synthesis of the light sensitive molecules. The Examiner's analysis, however, is inconsistent with the breadth of the claimed invention.

That is, as pointed out above, the claimed invention is not directed to a method of synthesizing a light sensitive molecule. The claimed invention is directed to using a light sensitive molecule as a molecular manipulator (e.g., a tweezer; according to a non-limiting example illustrated in the specification).

The originally filed specification discloses, in detail, how the light sensitive molecule (illustrated in Figure 1A and 1B) are formed in a molecular manipulator (e.g., see Figures 2 and 3; see Application at page 13, line 18 through page 14, line 17) and how the molecular manipulator is used for moving a nanostructure (e.g., see Figure 4; see Application at page 14, line 18 through page 15, line 7).

#### Nature of the Invention

The Examiner again alleges, "the specification discloses unenabled utility of the fictitious molecules, with no guidance for the synthesis of the molecules."

Again, Applicants submit the claimed invention is not directed to a method of synthesizing a light sensitive molecule. Accordingly, it is not necessary for Applicants to provide a detailed explanation of the synthesis of the light sensitive molecule.

#### The State of the Prior Art

The Examiner alleges, "[n]one of recited papers indicate the possibility of using molecules recited in the claims and those depicted in Figures 1 and 2 as

molecular manipulators; the examiner did not find any references, which would disclose a synthesis of similar compounds.”

First, Applicants submit that, as described in the Background of the Invention and Summary of the Invention sections of the Application, the light sensitive molecules discussed in the Application have not been used conventionally in molecular manipulators. That is one of the novel features of the claimed invention.

Second, Applicants again submit that the documents submitted in the Information Disclosure Statement filed on August 19, 2003 illustrate the synthesis of similar light sensitive molecules.

Amount of Direction Provided By the Inventor

The Examiner alleges, “[t]he instant disclosure does not provide any direction for synthesis of the hypothetical structure disclosed in the specification. The instant disclosure does not provide any direction for application of these fictitious structures as molecular manipulators.”

Again, Applicants submit the claimed invention is not directed to a method of synthesizing a light sensitive molecule. Accordingly, it is not necessary for Applicants to provide a detailed explanation of the synthesis of the light sensitive molecule.

Furthermore, the originally filed specification discloses, in detail, how the light sensitive molecule (illustrated in Figure 1A and 1B) are formed in a molecular manipulator (e.g., see Figures 2 and 3; see Application at page 13, line 18 through page 14, line 17) and how the molecular manipulator is used for moving a nanostructure (e.g., see Figure 4; see Application at page 14, line 18 through page 15, line 7).

#### Existence of Working Examples

Applicants again point out that “[c]ompliance with the enablement requirement of 35 U.S.C. 112, first paragraph, does not turn on whether an example is disclosed. An example may be ‘working’ or ‘**prophetic**’. A prophetic example describes an embodiment of the invention based on predicted results rather than work actually conducted or results actually achieved. An applicant need not have actually reduced the invention to practice prior to filing” (see M.P.E.P. § 2164.02; emphasis add by Applicants). Therefore, Applicants submit that the examples provided in Figures 1 and 2 of the Application are sufficient for purposes of providing an enabling disclosure of the claimed invention.

#### Quantity of Experimentation Needed

With respect to the Examiner’s allegations that the experimentation required by one of ordinary skill in the art would have been “undue”, Applicants submit that “[t]ime and difficulty of experiments are not determinative if they are merely routine.” (See M.P.E.P. § 2164.06; emphasis added by Applicants). Applicants submit that the experimentation required by one skilled in the related art to make and use the claimed invention is clearly routine (as is illustrated in the documents submitted in the Information Disclosure Statement filed on August 19, 2003).

Moreover, Applicants submit that since the level of skill in the related art is high, the degree of experimentation that is considered routines is also high. Applicants submit that the amount of experimentation required to make and use the claimed invention is commensurate with the level of skill in the related art.

Applicants maintain that since the claimed invention is not directed to a method of synthesizing a light sensitive molecule, it is not necessary for Applicants to provide a detailed explanation of the synthesis of the light sensitive molecule. Moreover, Applicants submit that the synthesis of such compounds is well-known in the art and the synthesis of such compounds is within the skill of one of ordinary skill in the art. Finally, Applicants submit that one of ordinary skill in the art, in view of the description provided in the originally filed specification and the knowledge commonly known to one of ordinary skill in the art would have been able to make and use the claimed molecular manipulator.

Furthermore, Applicants previously submitted a Declaration Under 37 C.F.R. §1.132 signed by a person of ordinary skill in the art attesting to Applicants' position above.

Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

### **III. THE 35 USC §112, SECOND PARAGRAPH REJECTION**

The Examiner alleges that the claimed invention of claims 1, 3, 4, 11-13, and 15-18 is indefinite for allegedly failing to particularly point out and distinctly claim the subject matter of the claimed invention.

Specifically, the Examiner alleges that the term "molecular manipulator" is unclear. The Examiner, however, is clearly incorrect.

That is, the specification clearly defines the term "molecular manipulator" (e.g., see Application at page 11, lines 6-13). Furthermore, the specification explains how the molecular manipulator is formed by attaching the molecule to a probe (e.g., see Application at page 14, line 6 through page 15, line 7).

Moreover, the specification clearly illustrates the moiety at a central fragment between the two arms (e.g., see Application at Figure 1A). One of ordinary skill in the art would clearly understand the plain meaning of the phrase “central fragment.”

In view of the foregoing, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

#### **IV. THE PRIOR ART REFERENCES**

##### **A. The Stiller Reference**

The Examiner alleges that one of ordinary skill in the art would have modified Stiller to teach the claimed invention of claims 1, 3, 4, 11-13, 15, 16, and 18. Applicants respectfully submit, however, that Stiller does not teach or suggest each feature of the claimed invention.

That is, Stiller does not teach or suggest, “*a central fragment of said light-sensitive compound between said two arms, which comprises a moiety, said moiety comprising a functional group selected from a group consisting of a sulfide, a thiol, and an isonitrile*”, as recited in exemplary claim 1.

Indeed, the SH-group in Stiller is not a functional group of the moiety at a central fragment of the light-sensitive compound. Indeed, as is clearly illustrated in Figure 1 of Stiller, the SH-group is disposed at an end of one of the arms of the compound. Accordingly, Stiller does not teach or suggest at least this feature of the claimed invention.

The Examiner, however, alleges that it would have been obvious to replace the H in the SH group with a second arm, identical to the compound illustrated in Figure 1 of Stiller.

Applicants submit, however, that one of ordinary skill in the art would not have modified Stiller as alleged by the Examiner. Indeed, the Examiner is attempting to replace the chemical compound disclosed in Stiller with a completely different compound. The Examiner's alleged modification is clearly inappropriate and Stiller does set forth an reason why one of ordinary skill in the art would replace the compound of Stiller with the Examiner's modified compound.

Moreover, a thiol group is a functional group composed of a sulfur atom and a hydrogen atom (-SH). By replacing the H, as suggested by the Examiner, the resulting compound would not longer include the recited thiol functional group.

Therefore, Applicants submit that the alleged combination of references does not teach or suggest each feature of the claimed invention. Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

#### **B. The Nakagawa Reference**

The Examiner alleges that one of ordinary skill in the art would have combined Nakagawa with Stiller to teach the claimed invention of claim 17. Applicants respectfully submit, however, that, even if combined, the alleged combination of references does not teach or suggest each feature of the claimed invention.

Indeed, Applicants submit that claim 17 is allowable at least based on similar reasons to those set forth above in section A with respect to claims 1-4, 10-16, and 18.

Therefore, Applicants submit that the alleged combination of references does not teach or suggest each feature of the claimed invention. Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw these rejections.

## **V. FORMAL MATTERS AND CONCLUSION**

The Examiner has objected to the specification under 35 U.S.C. § 132 (a) as allegedly containing new matter. Specifically, the Examiner alleges that the Amendment filed on February 19, 2008 introduced new matter into the specification. The Examiner, however, is clearly incorrect.

That is, as explained in detail in section I, above, the originally filed specification provides support for each and every feature recited in the claimed invention. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this objection.

The Examiner has also objected to the specification as allegedly failing to provide an enabling disclosure. The Examiner, however, is clearly incorrect.

That is, as explained in detail in section II, above, the originally filed specification provides an enabling disclosure for the claimed invention. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this objection.

In view of the foregoing, Applicant submits that claims 1, 3, 4, 11-13, and 15-18, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to

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(YOR.429)

credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,

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